DOGS®

Digital Optimization of Grid Systems (DOGS ®)

DOGS is an interactive software program that analyzes large sets of digital bathymetric data and optimizes the points, generating an optimal subset to represent the region. The smaller data set generated by DOGS can be used as a stand-alone bathymetric representation of the area or can serve as input to other programs, models, or GIS applications that need bathymetry data.

Entering Data

Bathymetric data generally come from NOAA's National Ocean Service survey data. These data have been collected from hydrographic surveys over the last few decades at various resolutions. The data are translated into a standard format for input to DOGS. The initial file may contain up to tens of thousands of data points; with DOGS, an optimal subset of a few hundred points may well describe the bathymetry in the region being analyzed. The program allows you to specify the acceptable error in relative or absolute terms (e.g., 1% or 25 cm). Digital shoreline data,typically from NOS charts, may be included in the analysis to bound the domain.

DOGS analyzes the bathymetric data using a process that creates geodesic domes from triangles to topologically represent the shape of the bottom. Starting with relatively few points, triangles are derived and the error is calculated. Points are successively added to eliminate the maximum existing error until the fit is within the accuracy specified by the user. The resulting ordered set of points defines the terrain with increasing accuracy. DOGS lets you determine the number of points needed to resolve the topological accuracy required, as well as examine the trade-off associated with changing the number of points. The geodesic dome characterization of the bathymetry can provide bathymetric data on any desired grid. Similar to the procedure used to reduce the number of bathymetry points, DOGS provides an option to optimize the number of shoreline points.

Graphically Displaying Information

Graphical displays of the data set and the ability to select portions of the visible data (down to selecting a specific point) allow you to quickly identify potentially erroneous data in the original set. These errors may result from instrument errors or incorrect depth coding. By selecting the point or area and using tools provided in DOGS, you can often determine the source of the error. You may choose not to include the erroneous data in the anlaysis. You may specify a resolution and view the original data or the optimized subset as color contours or vector contour lines.

Output Data

Other output from DOGS can include the ordered subset of data points, vector contour lines, and interpolated depth values on a grid that you specify. These bathymetric analysis products may then be used for other programs. OR&R uses the optimum subset of data as input to hydrodynamic models which depend on the shape of the bottom. The results from the hydrodynamic models are then used as input for trajectory analysis programs that have been developed for estimating the movement of pollutants. ORR can also use the vector contours to display bathymetry as overlays on Environmental Sensitivity Index (ESI) maps.

For additional information: visit the website:
http://response.restoration.noaa.gov
or send e-mail:
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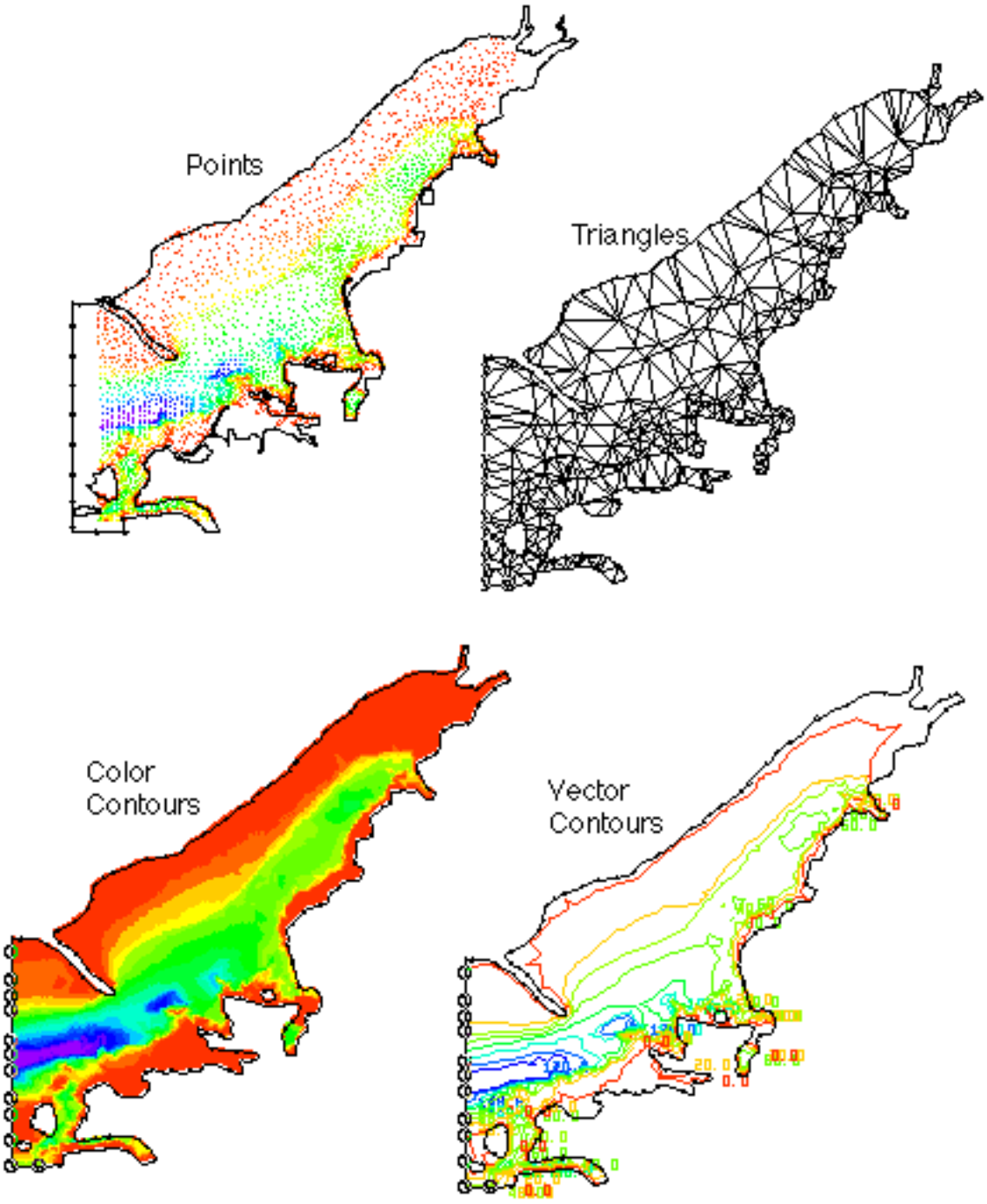
or call: 206/526-6317



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